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10/541,130	06/22/2006	Swee Liang Mak	Q88762	4526

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EXAMINER	
COHEN, JODI F	

ART UNIT	PAPER NUMBER
1791	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/541,130	MAK ET AL.	
	Examiner	Art Unit	
	Jodi Cohen	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 June 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30 and 32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30 and 32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-28 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Currently claim 1 recites the limitation "and wherein the porosity increases gradually away from the outer surface of the product and decreases gradually towards another outer surface of the product". The section of the specification applicant provided (page 10, line 21 through page 11, line 4) is not considered to provide support for this amendment. The section of the specification describes the pore size itself varying gradually, but does not state the porosity itself varies gradually away from the outer surface and decreases gradually toward another surface. It is considered the pore size itself can vary gradually but the overall porosity of a section may remain constant and thus the newly added limitation would not be inferred from this section as well.

3. Claims 1-30 and 32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. claims 1 and 30 currently contain the limitation, "and wherein the porosity increases gradually away from the outer surface of the product and decreases gradually towards another outer surface of the product" Gradually is not explicitly defined in the specification nor the claims and thus it is not clearly understood what is meant by the term "gradually" considered a relative term that varies depending on a references. Gradually is a matter of perception.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 3, 6 10-11, 13-17, 26-29, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jensen (US 20020047223) herein after referred to as '223.

Regarding claims 1, 17, and 29, '223 discloses a method of manufacturing a porous cementitious product, which method comprises:

forming a cementitious slurry, or premix;

pouring the slurry into a mold;

generating gas bubbles within the slurry via foaming agent (103) and a mixer;

and curing the slurry mixture,

wherein the gas bubbles are collapsed at the interface of the mold and slurry in order to create a relatively low density core region and higher density outer region, or skin [0029]-[0032].

Jensen discloses generating bubbles into the cementitious premix and then casting said premix in order to create a porous cementitious product. Claim 1 of the present application forms a cementitious premix similar to Jensen wherein the premix is cast into a mold prior to generating bubbles within the premix. Both Jensen and the current application disclose casting cementitious premixes and both Jensen and the current application disclose generating bubbles within the premix in order to form pores therein to create a porous cementitious product. The only difference between the prior art process of Jensen and claim 1 of the current application is when gas bubbles are introduced into the premix to create the pores. Where both processes add pores through the addition of bubbles to the premix and achieve the same desired result of a porous cementitious product, it would have been obvious to one of ordinary skill in the art to generate gas bubbles after casting because the court has held that selection of any order of performing process steps is *prima facie* obvious in the absence of new or unexpected results. See MPEP 2144.04, *Ex parte Rubin*, 128 USPQ 440 (Bd. App. 1959), *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) and *In re Gibson*, 39 F.2d 975, 5 USPQ 230 (CCPA 1930). Additionally, Jensen teaches adding bubbles to the cementitious premix to create pores prior to casting of the premix. Jensen also discloses collapsing these pores using the mold in which the premix is cast. Thus one of ordinary skill in the art would be inclined to generate bubbles within the premix after

being cast into the mold so that more pores may be created where the mold has caused them to collapse, if necessary.

Additionally, it is considered that the porosity in the product as taught by Jensen increases away from an outer surface. The dense skin covering the outer surface has a low porosity while the inner core of the product has more air cells left intact and thus a higher porosity. Therefore the low porosity, dense skin at one surface would increase through the high porosity center towards an opposite surface and then decrease again approaching the dense out layer of another surface.

Claim 1 requires that the porosity increase and decrease gradually. Gradually is considered a relative term that varies depending on a reference. It is considered that any change in porosity could be considered gradual in reference to a less gradual change in porosity. This being said, one of ordinary skill in the art would recognize that air cells would not collapse evenly at the outer surface of the product. There would not be a clear line of distinction between the dense outer skin and the remaining body of the product. At least some air cells at the interface would remain intact and at least some air cells would collapse, thus compared to a clear line of demarcation the change in air cells, and thus porosity, would be considered gradual [0032].

Regarding claim 3, '223 discloses a method of manufacturing a porous cementitious product wherein cementitious slurry is compressed within a mold by a lid in order to force out air cells at the lid/ slurry interface to create a dense outer layer [0083], [0087]. '223 does not disclose the lid of is fabricated to allow gas dissipation, however, it would have been obvious to one of ordinary skill in the art that if the purpose of the lid

is to force air out, it would be obvious for a person of ordinary skill in the art to have the lid be capable of allowing the gas to dissipate.

Regarding claim 6, '223 discloses using vibrations, after the mix has been poured into the mold, to collapse bubbles in order to alter the density of the cementitious slurry It would have been obvious to one of ordinary skill in the art at the time of the invention through routine experimentation, to have determined an optimum frequency and amplitude for vibrating the mixture because '223 teaches vibrating the mixture in order to alter the porosity of the mixture [0079]. See MPEP 2144.05

Regarding claims 10-11, '223 discloses cementitious slurry comprising a selection of specific components and composition having a certain viscosity at a selected temperature to resist migration of the air cells, or bubbles. [0079]

Regarding claims 13, '223 discloses controlling the amount of foaming and collapsing of bubbles in order to produce a product with a specific strength and density [0086]. More specifically, Jensen collapses gas bubbles on the outer layer of the cast premix in order to create a denser outer layer [0032]. Thus the strength density of the product is controlled by varying gas bubbles that are collapsed and those that are retained.

Regarding claim 14, '223 discloses dense outer shells of different strengths and densities may be formed by applying different amounts of compression to the cementitious slurry [0083], [0086]

Regarding claim 15, '223 does not explicitly disclose the strength to density ratio of the cementitious product is controlled by selection based on premix strength. '223

discloses controlling the amount of foaming or incorporation of fibers within the cementitious slurry in order to produce a product with a specific strength and density [0020], [0086]. Thus, it would have been obvious to on of ordinary skill in the art that the composition and properties of the cementitious slurry directly affects the strength of the cementitious product.

Regarding claim 16, '223 discloses that the cementitious product may be finished by cutting the molded product into a plurality of cement products [0008], [0105].

Regarding claim 26, '223 discloses the cementitious product is a building unit [0021]. Moreover, a wall unit and roofing tile are all units encompassed by the term "building unit". A building unit can be formed in any shape; furthermore the shape of the cementitious object would be dependent on the mold and a matter of design choice to one of ordinary skill in the art. See MPEP 2144.02

Regarding claim 27, '223 discloses imparting a patterned surface on the product [0039], [0088].

Regarding claim 28, '223 discusses making various cementitious products using the method discussed above. Furthermore '223 discusses a single cementitious premix wherein the strength to density ratio of each cementitious product is controlled by the amount of compression of the premix within the mold [0083], [0087], which is considered to be varying the degree confinement of the premix.

Regarding claim 32, '223 discloses a lid (404) in order to compress, and thus restrain, the rising of the premix, which causes collapsing of expanding premix on contact with the lid [0083], [0086]-[0087].

7. Claims 4 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jensen (US 20020047223) as applied to claim 1 above and further in view of Hansen (US 5039249) herein after referred to as '246.

Regarding Claims 4 and 16, '223 discloses mixing and vibrating the cementitious slurry as well as smoothing, or imparting a pattern to the slurry via lid (404), which can all be considered forms of screeding, wherein the application of the lid simultaneously causes collapsing of air bubbles within the slurry. However '223 does not explicitly teach trowelling or screeding the slurry mixture.

Hansen teaches screeding and trowelling art known methods in the art for smoothing and leveling concrete or cement mixtures. Thus, it would have been obvious to one of ordinary skill in the art to smooth or spread the cementitious slurry by any additional method known in the art, such as screeding or trowelling which Hansen specifically teaches to smooth or level concrete mixtures.

8. Claims 2, 5, 12, 18-23, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jensen (US 20020047223) as applied to claim 1 above, and further in view of Shi et al. (US 20020117086), referred to as '086 herein after.

Regarding claims 2 and 11-12, '223 discloses a method of making a porous cementitious product as discussed above however; is silent about the inclusion of additives such as a heat activated gas generating agent, or a superplasticizer.

'086 discloses a method for making lightweight concrete materials comprising air pores wherein the bubbles that create the air pores are generated by a heat activated gas-forming agent such as aluminum sulfate [0039], [0053]. Additionally '086 discloses incorporating a superplasticizer within the cementitious slurry in order to approve the workability and flowability, or viscosity, of the slurry [0052], [0071].

Both '223 and '086 disclose making cementitious products by incorporating bubbles within a cement premix to create voids. '223 teaches mixing of a foaming agent [0077] within the premix to generate bubbles, while '086 discloses using foaming agent or aluminum sulfate to generate bubbles within the premix. Thus it would have been obvious to one of ordinary skill in the art to substitute the gas-producing aluminum sulfate taught by '086 for the foaming agent in the method of '223 to obtain the predictable result of creating voids within a cementitious premix. Furthermore it would have been obvious to one of ordinary skill in the art to incorporate other additives known in the art, such as a superplasticizer, in order to improve characteristics, such as the flowability, of the cementitious slurry. See MPEP 2141

Regarding claim 5, '223 discloses using vibrations, after the mix has been poured into the mold, to collapse bubbles in order to alter the density of the cementitious slurry It would have been obvious to one of ordinary skill in the art at the time of the invention through routine experimentation, to have determined an optimum frequency and amplitude for vibrating the mixture because '223 teaches vibrating the mixture in order to alter the porosity of the mixture [0079]. See MPEP 2144.05

Regarding claims 18-23, '223 discloses a method of making a porous cementitious product as discussed above, however '223 is silent about the composition and characteristics of the cementitious slurry. '086 also discloses a method for making a porous cementitious product comprising a cementitious slurry; infusing the slurry with bubbles and curing the slurry to produce a lightweight concrete products with compressive strengths ranging from 1000 psi, or 6.89 MPa, to about 6,000 psi, or 41 MPa, and preferably of 14.3 MPa wherein the compressive strength after 14 hours of curing is 75% to about 90% of the 28 day curing strength. Furthermore, '086 discloses the concrete products having a dry density ranging from 45 lbs/ft^3, or 720 kg/m^3, to about 90 lbs/ft^3, or 1441 kg/m^3, and preferably about 1086 kg/m^3. '086 also discusses the use of fiber ensures the stability of the cellular structure and the aggregate in the concrete mixture slurry, and increases the flexural strength (Tables 1-5, [0020], [0029], and [0071]).

Both '223 and '086 disclose making cementitious products by incorporating voids within a cement/ concrete slurry. '223 teaches a method for manufacturing the porous cementitious product however '223 is silent about the composition of the cementitious slurry to be cast into the mold. '617 discloses a high strength concrete mixture comprising a specific composition and selection of additives for making cementitious product with specific properties as discussed above. Thus it would have been obvious to one of ordinary skill in the art to apply the method of '223 to the cementitious composition with the properties as taught by '617 to yield the predictable results of a molded cementitious product with a dense outer skin and a desirable compressive

strength and dry density. Furthermore it would have been obvious to one of ordinary skill in the art through ordinary experimentation to determine the optimum composition comprising the additives as taught in '086 to achieve the a slurry and product with optimal compressive strength, flexural strength, plasticity, impact resistance and dry density. See MPEP 2141 and 2144.04.

Regarding claim 25, '086 discloses a product with a water content ranging from 13.8 wt % to about 33.3 wt% which can be considered low.

9. Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jensen (US 20020047223) as applied to claim 1 above, and further in view of Kovacs et al. (WO 98/42637) referred to as '637 herein after.

Regarding claim 7-8, '223 discloses a method of making a porous cementitious product as discussed above furthermore '223 discloses incorporating bubbles within the premix by supplying or blowing air directly into the premix [0077], however, '223 does not disclose introducing gas bubbles at selected locations within the premix by use of sparging apparatus.

'637 discloses a method of making a foamed masonry product comprising a cement slurry, or cementitious premix, and where gas is dispensed within the cement slurry using an injector, wherein the injector comprises one or more lance nozzles with a plurality of capillary holes for dispersing gas at various locations within the slurry in order to create bubbles or pores within the cement mixture. '223 teaches mixing of a heated foaming agent within the premix to generate bubbles, while '637 discloses using a lance nozzle to inject gas in order to generate bubbles within the premix. Thus it

would have been obvious to one of ordinary skill in the art to substitute the injection nozzle taught by '637 for the foaming agent in the method of '223 to obtain the predictable result of creating voids within a cementitious premix and producing a cementitious product that is lighter than a cementitious product without the bubbles incorporated therein. See MPEP 2141

Regarding claim 9, '637 teaches a stationary lance to introduce gas into the contentious slurry with mixing to provide an even distribution of the gas suspension through the premix. '637 is silent about moving the lance through the slurry, however it would have been obvious to one of ordinary skill in the art to have moved the lance through the premix during injection of the gas in order to provide the injection of gas and mixing simultaneously.

10. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jensen (US 20020047223) as applied to claim 1 above, and further in view of Ainsley et al. (US 5587012) referred to as '012 herein after.

Regarding claim 24, '223 discloses a method of making a porous cementitious product as discussed above wherein heat is supplied to the cementitious slurry, however '223 does not disclose using high shear mixing to vary the temperature of the slurry or the premix rheology. "012 discloses a method of making a cementitious product comprising cementitious slurry where the slurry is mixed to achieve a specific viscosity. Thus it would have been obvious to one of ordinary skill in the art to mix the cementitious slurry in the method of '223 because '012 teaches mixing of cementitious

slurries to achieve a desired viscosity and provide better flow characteristics. Additionally, the act of mixing would add energy to the slurry thereby adding heat.

Response to Arguments

11. Applicant's arguments filed 06/08/2009 have been fully considered but they are not persuasive. Applicant's argue that the product of the present invention includes relatively dense outer regions with porosity gradually increasing away from those regions. In other words, the distribution of porosity in the product of the present invention may be represented by a relatively smooth curve of distance along a graph of cross-section versus porosity. Where process described by Jensen is one that does not generate the same porosity profile as called for in the claims of the present application. Applicant cites paragraph [0032] of Jensen, which states:

> "As the cementitious slurry is poured into the mold, the air cells in the slurry that contact the surface of the heated mold collapse producing an outer layer of cement with fewer air cells. The use of a heated cementitious slurry in conjunction with the aid of the heated mold quickly cures the slurry such that the entrained air cells are prevented from coalescing, interconnecting, or migrating. Thus, the air cells remain evenly dispersed throughout the slurry. The hardened outer shell produced by the heated mold produces a dense outer layer that reduces the ability of the cement to draw in water by capillary action." (emphasis added)

Applicant argues; Jensen may produce a product that has a relatively dense outer skin. However, within the bulk of the product it is clear that the porosity profile would be essentially uniform.

In response to applicant's argument, it is true that the process of Jensen discloses creating a dense outer skin by collapsing air cells [0032] while the air cells within the inner bulk of the product remains intact and evenly dispersed. As amended

claim 1 requires that the porosity increases gradually away from an outer surface of the product and decreases gradually toward another surface. It is considered Jensen teaches a method for forming a dense outer surface by collapsing air cells with heated mold surfaces in order to provide a stronger structure, thus it would be obvious to one of ordinary skill in the art to provide heated mold surfaces in desired locations in order to produce the desired dense outer areas. Thus one would be fully capable of creating a dense outer skin on solely one side which would cause the porosity to increase gradually away from an outer surface of the product and decrease gradually toward another surface. Additionally it is considered that if one were to look at the interface of the dense outer skin where the cells are collapsed and the remainder of the product where the cells remain intact that one would find a mixture of collapsed cells and intact cells, thus creating a gradual transition in porosity.

It has been well established by Jensen that collapsing of air cells in a cementitious premix creates a denser and stronger product. Jensen applies this notion to the entire surface of the cast premix, resulting in a dense outer layer that surrounds the entire product; however because Jensen has established a direct result effective variable between collapsing air bubbles (or the porosity of air bubbles) within a cementitious mixture and the strength density of that article it would be obvious to one of ordinary skill in the art to use the modify the method of Jensen and collapse air bubbles in the desired locations to increase the strength density of the article. See MPEP 2144.05 regarding result-effective variables.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jodi Cohen whose telephone number is 571-270-3966. The examiner can normally be reached on Monday-Friday 7:00am-5:00pm Eastern.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jodi F. Cohen/
Examiner, Art Unit 1791
/ Carlos Lopez/
Primary Examiner, Art Unit 1791